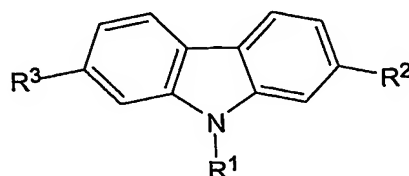


More specifically, the present invention relates to a compound of Formula I:



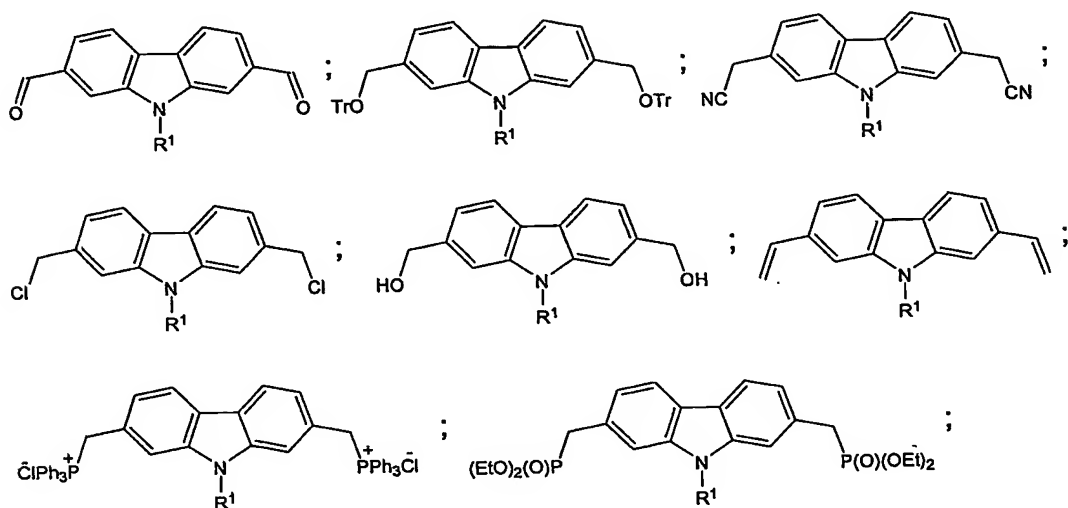
Formula I

[0010] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl, and 4-octyloxyphenyl; R<sup>2</sup> and R<sup>3</sup> are independently selected from the group consisting of H, methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, methyltriphenylphosphonium and vinyl,

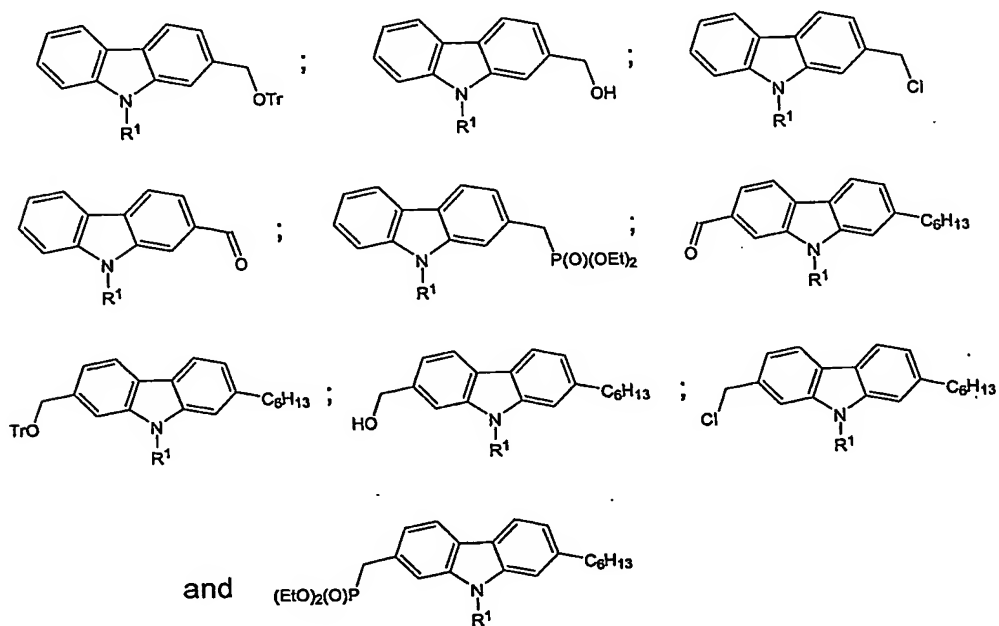
[0011] with the proviso that: both R<sup>2</sup> and R<sup>3</sup> are not H; when R<sup>1</sup> is methyl, both R<sup>2</sup> and R<sup>3</sup> are not formyl; when R<sup>2</sup> is methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, or decyl, R<sup>3</sup> is selected from the group consisting of formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, methyltriphenylphosphonium and vinyl; and when R<sup>1</sup> is ethyl, R<sup>2</sup> is selected from the group consisting of hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, and methyltriphenylphosphonium and R<sup>3</sup> is selected from the group consisting of H, methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate,

methyltriphenylphosphonium and vinyl.

[0012] Yet more specifically, the present invention relates to 2 functionalized and 2,7-difunctionalized carbazoles selected from the group consisting of:



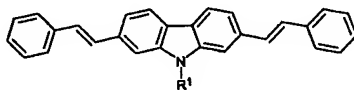
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[0013] The present invention also relates to 2,7-carbazolenevinylene-based oligomers as well as to methods for preparing these oligomers.

[0014] Yet more specifically, the present invention relates to a 2,7-carbazolenevinylene-based oligomer comprising the reaction product of a first compound of Formula I wherein at least one of  $R^2$  or  $R^3$  is selected from the group consisting of formyl, methyl diethylphosphonate, methyltriphenylphosphonium, cyanomethyl, and vinyl and wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octylphenyl, and at least a second compound, said second compound being either a compound of Formula I wherein at least one of  $R^2$  or  $R^3$  is selected from the group consisting of formyl, methyl diethylphosphonate, methyltriphenylphosphonium, cyanomethyl, and vinyl and wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octylphenyl; benzaldehyde; 5,5'-diformyl-2,2'-bithiophene, 4-bromo-1,1'-biphenyl; benzyl cyanide; or 1,4-bis(methylphosphonate)benzene.

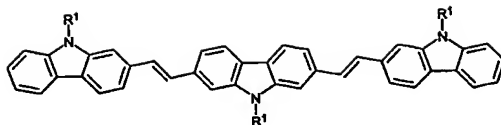
[0015] In a first particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:



[0016] wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

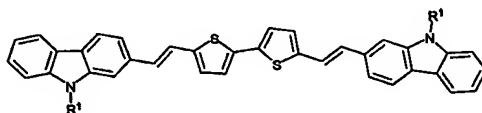
[0017] In a second particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:

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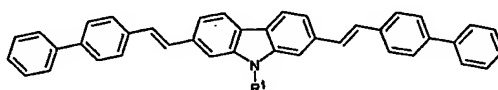
[0018] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

[0019] In a third particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:



[0020] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

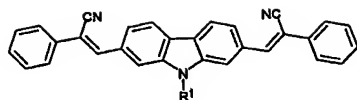
[0021] In a fourth particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:



[0022] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

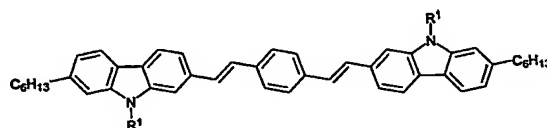
[0023] In a fifth particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:

7



[0024] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

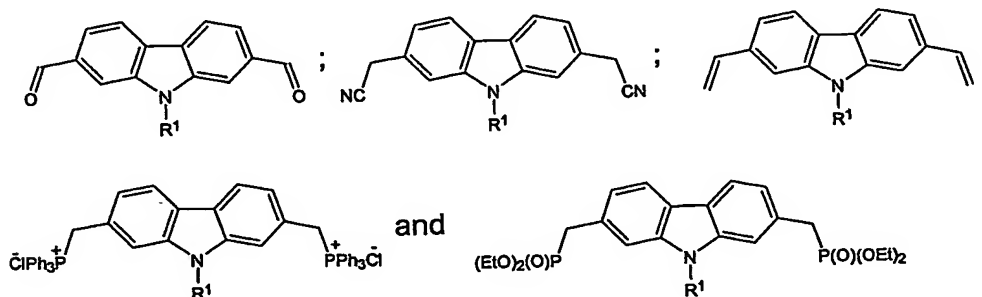
[0025] In a sixth particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based oligomer having the formula:



[0026] wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

[0027] The present invention additionally relates to 2,7-carbazolenevinylene-based polymers as well as to methods of preparing these polymers.

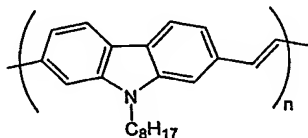
[0028] Yet more specifically, the present invention relates to 2,7-carbazolenevinylene-based polymers comprising the reaction product of a compound selected from the group consisting of



AMENDED SHEET

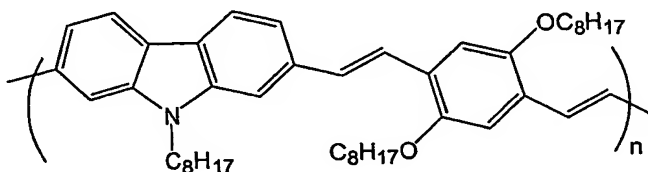
[0029] and optionally at least one compound selected from the group consisting of 2,5-dioctyloxy-1,4-diformylbenzene; 2,5-bis(diphenylamino)terephthaldicarboxaldehyde; [4-(2-ethylhexyloxy)-phenyl]-bis-(4'-formylphenyl) amine; 6,6'-dibromo-2,2'-bis(2"-ethylhexyloxy)-1,1'-binaphthyl; and 3-hexyl-2,5-bis(methylphosphonate)thiophene.

[0030] In a first particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based polymer having the formula:



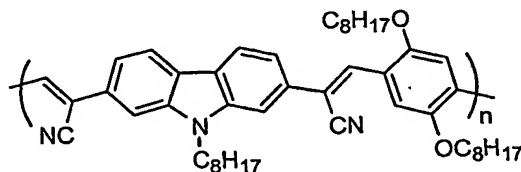
[0031] wherein "n" is an integer ranging from 5 to 100.

10 [0032] In a second particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based polymer having the formula:



[0033] wherein "n" is an integer ranging from 5 to 100.

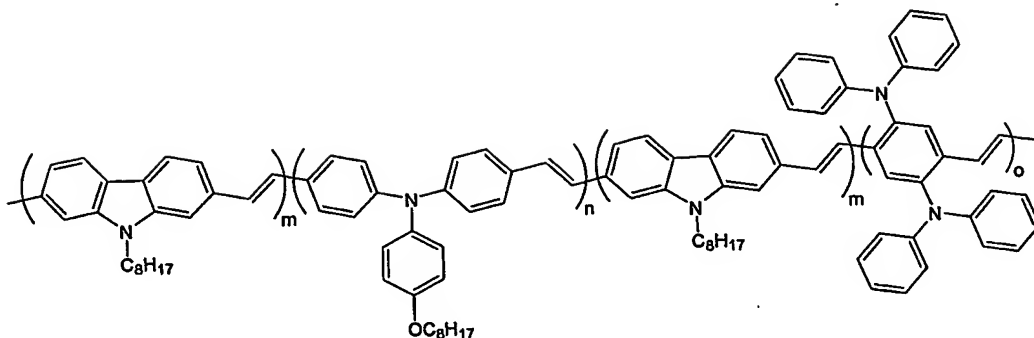
15 [0034] In a third particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based polymer having the formula:



[0035] wherein "n" is an integer ranging from 5 to 100.

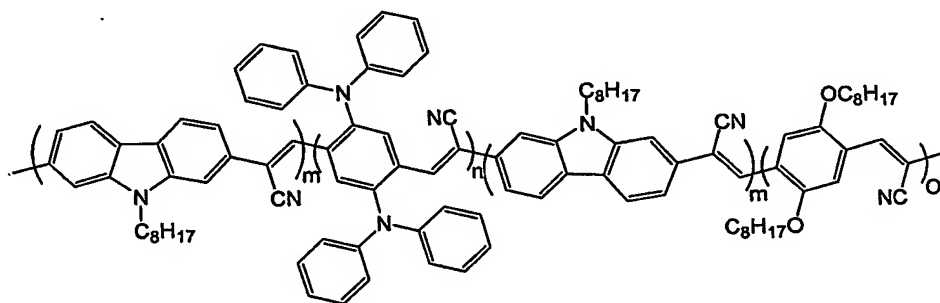
[0036] In a fourth particular embodiment, the present invention relates to a 2,7-carbazolenevinylene-based polymer having the formula:

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[0037] wherein "n", "m" and "o" are integers ranging from 5 to 100.

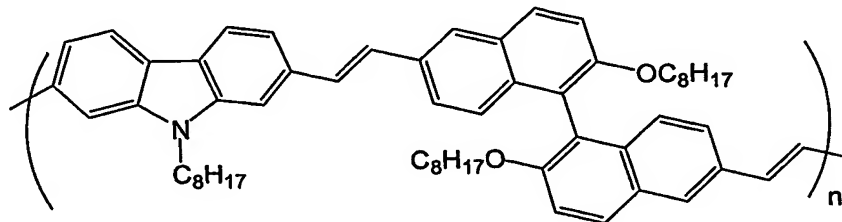
[0038] In a fifth particular embodiment, the present invention relates to a 2,7-carbazolevinylene-based polymer having the formula:



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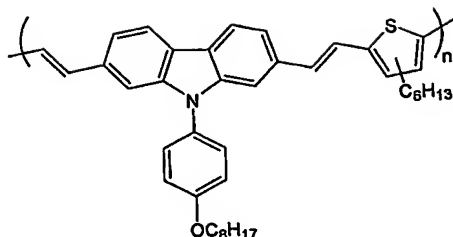
[0039] wherein "n", "m" and "o" are integers ranging from 5 to 100.

[0040] In a sixth particular embodiment, the present invention relates to a 2,7-carbazolevinylene-based polymer having the formula:



10 [0041] wherein "n" is an integer ranging from 5 to 100.

[0042] In a seventh particular embodiment, the present invention relates to a 2,7-carbazolevinylene-based polymer having the formula:



[0043] wherein "n" is an integer ranging from 5 to 100.

[0044] The present invention also relates to 2,7-carbazolenevinylene-based oligomers and polymers for use in applications including but not limited to field-effect transistors, light-emitting devices such as light-emitting diodes, and solar cells.

[0045] Other objects, advantages and features of the present invention will become more apparent upon reading of the following non-restrictive description of preferred embodiments thereof, given by way of example only with reference to the accompanying drawings.

# **BRIEF DESCRIPTION OF THE DRAWINGS**

[0046] In the appended drawings:

[0047] Figure 1 illustrates the synthesis of novel 2,7-difunctionalized carbazoles;

15 [0048] Figure 2 illustrates the synthesis of 2-functionalized carbazoles;

[0049] Figure 3 illustrates the chemical structure of various oligomers;

[0050] Figure 4 illustrates the chemical structure of various polymers;

[0051] Figure 5 provides a schematic illustration of the polymerization yield obtained for various polymers as well as their molecular weight;

20 [0052] Figure 6 provides a schematic illustration of the optical properties of



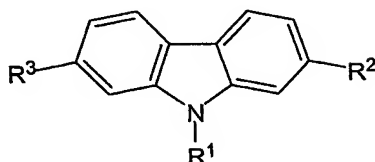
Büchner funnel. The resulting solid was washed thoroughly with water followed by methanol and dried under reduced pressure to provide 65.8 g of the title product as a white solid. M.P.: 250-251°C (Yield: 85%). <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>, ppm): 7.87 (s, 1H); 7.58 (m, 14H); 7.38 (m, 22H); 4.36 (s, 2H); 4.30 (s, 2H). <sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>, ppm): 149.32; 144.11; 143.73; 140.08; 139.37; 136.06; 134.82; 131.87; 130.53; 128.80; 128.71; 128.10; 127.97; 127.90; 127.37; 127.21; 127.16; 122.36; 87.58; 87.15; 65.40; 64.67.

**[0068] 2,7-bis(trityloxymethyl)carbazole (7):** In a 500 mL flask, compound 6 (40.0 g, 54.2 mmol) and triethylphosphite (250 mL) were mixed and refluxed under argon for 12 h. The mixture was cooled at 0°C and the precipitate was filtered through a Büchner funnel. The solid was washed thoroughly with methanol and dried under reduced pressure to provide 23.0 g of the title product as a white solid. M.P.: 240°C (dec.) (Yield: 60 %). <sup>1</sup>H NMR (400 MHz, THF-*d*<sub>8</sub>, ppm): 10.24 (s, 1H); 7.94 (d, 2H, *J* = 8.0 Hz); 7.53 (m, 14H); 7.28 (m, 12H); 7.20 (m, 6H); 7.08 (dd, 2H, *J* = 8.0 and 1.4 Hz); 4.30 (s, 4H). The <sup>13</sup>C NMR experiment could not be performed on this compound due to its very low solubility in common deuterated solvents.

**[0069] N-(2-ethylhexyl)-2,7-bis(trityloxymethyl)carbazole (8)<sup>9</sup>:** A 250 mL flask was charged with compound 7 (20.0 g, 28.4 mmol), sodium hydroxide (2.28 g, 56.8 mmol), tetrabutylammonium hydrogensulfate (0.48 g, 1.42 mmol), 2-ethylhexylbromide (11.0 g, 57.0 mmol, Aldrich Co.) and anhydrous acetone (140 mL). The resulting mixture was refluxed under argon for 24 h and then cooled at room temperature. Water (300 mL) was then added under vigorous stirring and the white precipitate formed was collected by filtration. The solid was dissolved in a small amount of acetone and poured into methanol at 0°C. The precipitate was filtered and rinsed thoroughly with methanol to provide 21.6 g of the title product as a white solid. M.P.: 180-182°C (Yield: 93 %). <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>, ppm): 8.15 (d, 2H, *J* = 8.0 Hz); 7.74 (d, 12H, *J* = 7.6 Hz); 7.68 (s, 2H); 7.46 (m, 12H);

**WHAT IS CLAIMED IS:**

1. A compound of Formula I:



**Formula I**

wherein:

R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl, and 4-octyloxyphenyl;

R<sup>2</sup> and R<sup>3</sup> are independently selected from the group consisting of H, methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, methyltriphenylphosphonium and vinyl,

with the proviso that:

both R<sup>2</sup> and R<sup>3</sup> are not H;

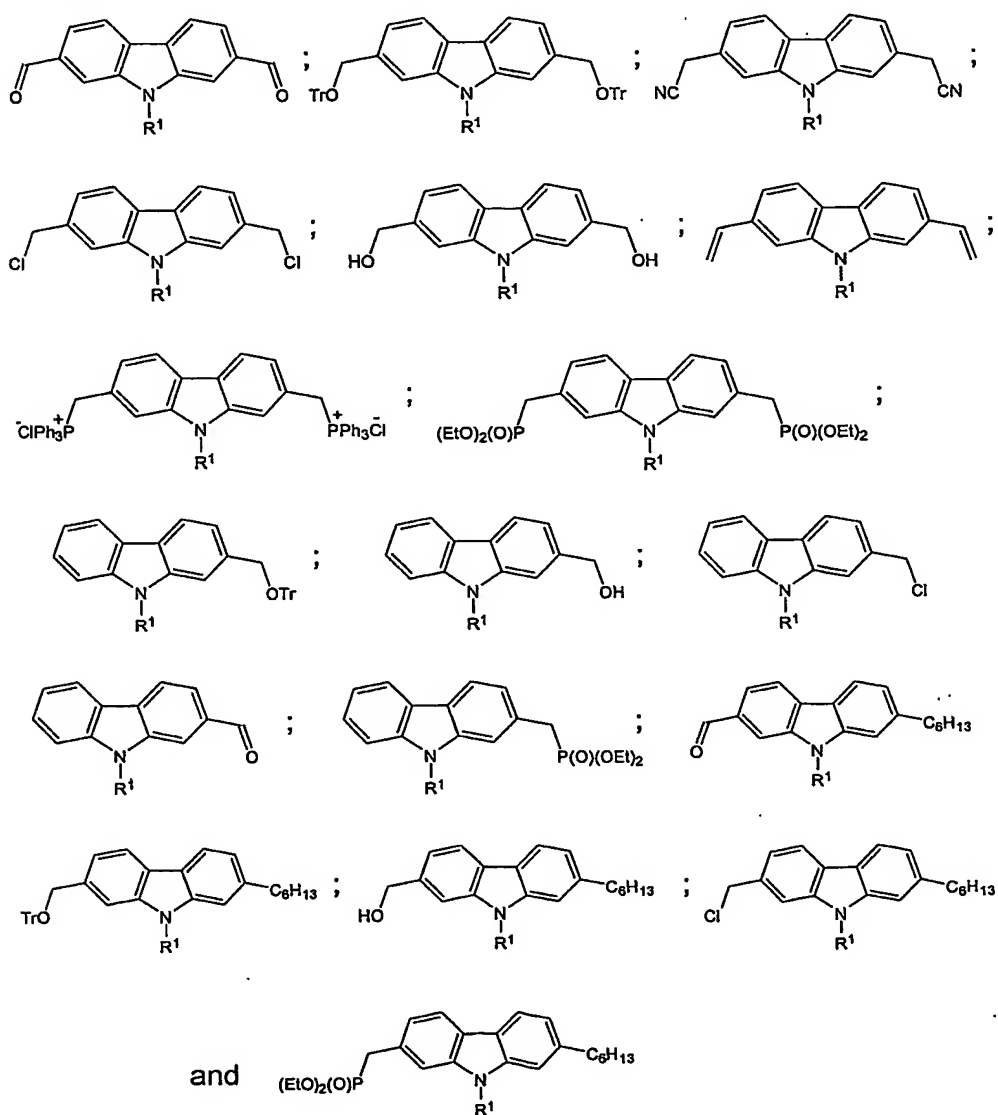
when R<sup>1</sup> is methyl, both R<sup>2</sup> and R<sup>3</sup> are not formyl;

when R<sup>2</sup> is methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, or decyl, R<sup>3</sup> is selected from the group consisting of formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, methyltriphenylphosphonium and vinyl; and

when R<sup>1</sup> is ethyl, R<sup>2</sup> is selected from the group consisting of hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, and methyltriphenylphosphonium and R<sup>3</sup> is selected from the group consisting of H,

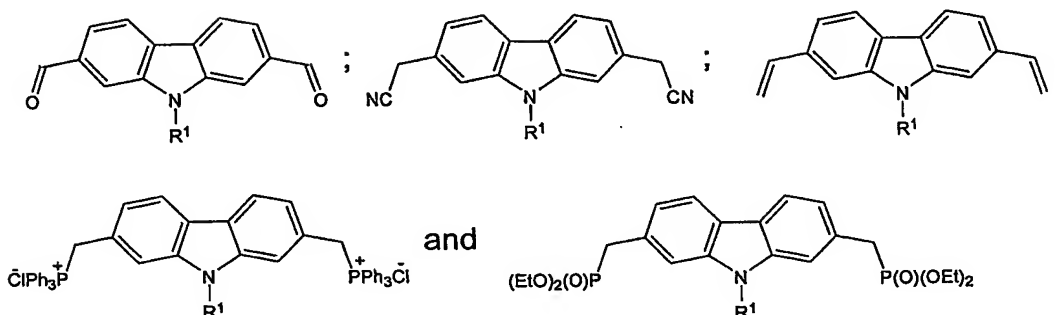
methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, formyl, hydroxymethyl, trityloxymethyl, cyanomethyl, chloromethyl, methyl diethylphosphonate, methyltriphenylphosphonium and vinyl.

2 A compound as defined in claim 1, selected from the group consisting of:



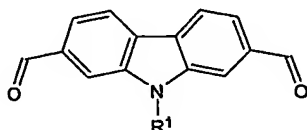
wherein  $R^1$  is as defined in claim 1.

3. A compound as defined in claim 1, selected from the group consisting of:



wherein  $R^1$  is as defined in claim 1.

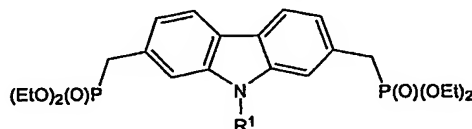
4. A compound as defined in claims 2 or 3 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

5. A compound as defined in claim 4, wherein  $R^1$  is hexyl, 2-ethylhexyl or 4-octyloxyphenyl.

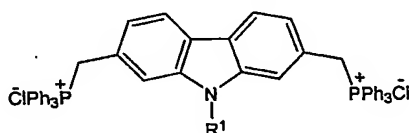
6. A compound as defined in claims 2 or 3 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

7. A compound as defined in claim 6, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

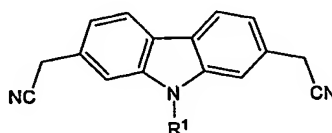
8. A compound as defined in claims 2 or 3 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

9. A compound as defined in claim 8, wherein R<sup>1</sup> is 2-ethylhexyl.

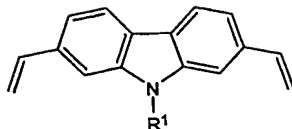
10. A compound as defined in claims 2 or 3 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

11. A compound as defined in claim 10, wherein R<sup>1</sup> is 2-ethylhexyl.

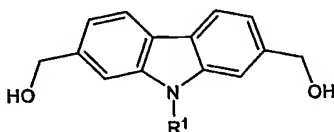
12. A compound as defined in claims 2 or 3 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

13. A compound as defined in claim 12, wherein R<sup>1</sup> is 2-ethylhexyl.

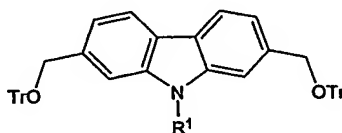
14. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

15. A compound as defined in claim 14, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

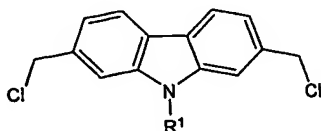
16. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

17. A compound as defined in claim 16, wherein R<sup>1</sup> is hexyl, 2-ethylhexyl or 4-octyloxyphenyl.

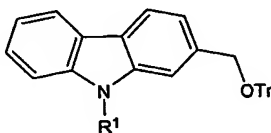
18. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

19. A compound as defined in claim 18, wherein R<sup>1</sup> is hexyl.

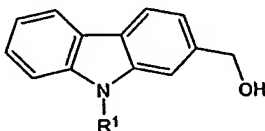
20. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

21. A compound as defined in claim 20, wherein R<sup>1</sup> is hexyl.

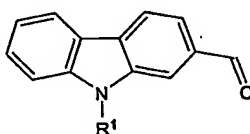
22. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

23. A compound as defined in claim 22, wherein R<sup>1</sup> is hexyl.

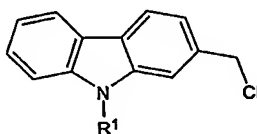
24. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

25. A compound as defined in claim 24, wherein R<sup>1</sup> is hexyl.

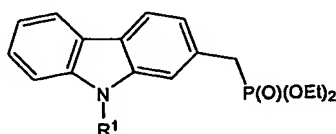
26. A compound as defined in claim 2 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

27. A compound as defined in claim 26, wherein R<sup>1</sup> is hexyl.

28. A compound as defined in claim 2 having the formula:

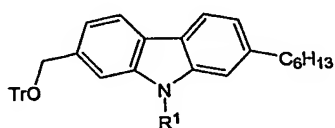




wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

29. A compound as defined in claim 28, wherein  $R^1$  is hexyl.

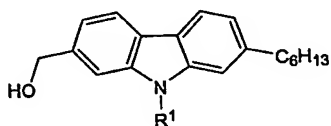
30. A compound as defined in claim 2 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

31. A compound as defined in claim 30, wherein  $R^1$  is methyl.

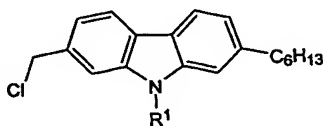
32. A compound as defined in claim 2 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

33. A compound as defined in claim 32, wherein  $R^1$  is methyl.

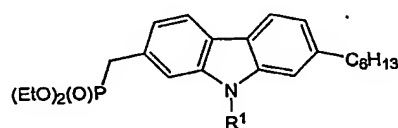
34. A compound as defined in claim 2 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

35. A compound as defined in claim 34, wherein  $R^1$  is methyl.

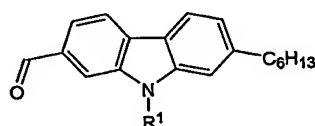
36. A compound as defined in claim 2 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

37. A compound as defined in claim 36, wherein  $R^1$  is methyl.

38. A compound as defined in claim 2 having the formula:



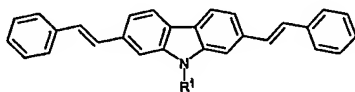
wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, and decyl.

39. A compound as defined in claim 38, wherein  $R^1$  is methyl.

40. An oligomer comprising the reaction product of a first compound of Formula I as defined in claim 1, wherein at least one of  $R^2$  or  $R^3$  is selected from the group consisting of formyl, methyl diethylphosphonate, methyltriphenylphosphonium, cyanomethyl, and vinyl and wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl,

*tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octylphenyl, and at least a second compound, said second compound being either a compound of Formula I as defined in claim 1, wherein at least one of  $R^2$  or  $R^3$  is selected from the group consisting of formyl, methyl diethylphosphonate, methyltriphenylphosphonium, cyanomethyl, and vinyl and wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octylphenyl; benzaldehyde; 5,5'-diformyl-2,2'-bithiophene, 4-bromo-1,1'-biphenyl; benzyl cyanide; or 1,4-bis(methylphosphonate)benzene.

41. An oligomer as defined in claim 40 having the formula:

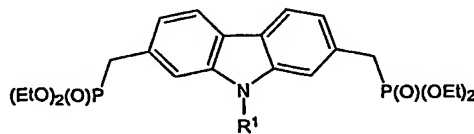


wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

42. An oligomer as defined in claim 41, wherein  $R^1$  is hexyl or 2-ethylhexyl.

43. An oligomer as defined in claim 42, wherein  $R^1$  is hexyl.

44. An oligomer as defined in claim 41 wherein the first compound of Formula I is of the formula:



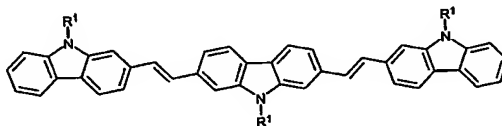
wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

45. An oligomer as defined in claim 44, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

46. An oligomer as defined in claim 45, wherein R<sup>1</sup> is hexyl.

47. An oligomer as defined in any one of claims 41 to 46, wherein the second compound is benzaldehyde.

48. An oligomer as defined in claim 40 having the formula:

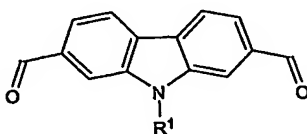


wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

49. An oligomer as defined in claim 48, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

50. An oligomer as defined in claim 49, wherein R<sup>1</sup> is hexyl.

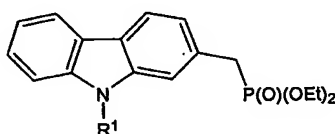
51. An oligomer as defined in claim 48 wherein the first compound of Formula I is of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

52. An oligomer as defined in claim 51, wherein  $R^1$  is hexyl, 2-ethylhexyl or 4-octyloxyphenyl.

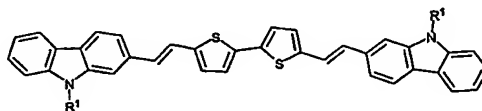
53. An oligomer as defined in claim 48 wherein the second compound of Formula I is of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

54. An oligomer as defined in claim 53, wherein  $R^1$  is hexyl.

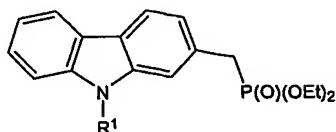
55. An oligomer as defined in claim 40 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

56. An oligomer as defined in claim 55, wherein  $R^1$  is hexyl.

57. An oligomer as defined in claim 55 wherein the first compound of Formula I is of the formula:

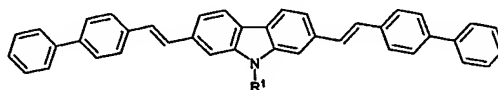


wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

58. An oligomer as defined in claim 57, wherein R<sup>1</sup> is hexyl.

59. An oligomer as defined in any one of claims 55 to 58, wherein the second compound is 5,5'-diformyl-2,2'-bithiophene.

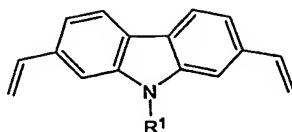
60. An oligomer as defined in claim 40 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

61. An oligomer as defined in claim 60, wherein R<sup>1</sup> is 2-ethylhexyl.

62. An oligomer as defined in claim 60 wherein the first compound of Formula I is of the formula:

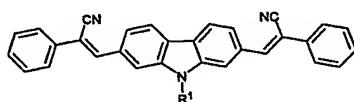


wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

63. An oligomer as defined in claim 62, wherein R<sup>1</sup> is 2-ethylhexyl.

64. An oligomer as defined in any one of claims 60 to 63, wherein the second compound is 4-bromo-1,1'-biphenyl.

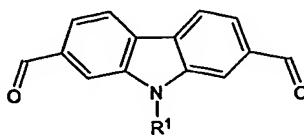
65. An oligomer as defined in claim 40 having the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

66. An oligomer as defined in claim 65, wherein R<sup>1</sup> is hexyl, 2-ethylhexyl or 4-octyloxyphenyl.

67. An oligomer as defined in claim 65 wherein the first compound of Formula I is of the formula:

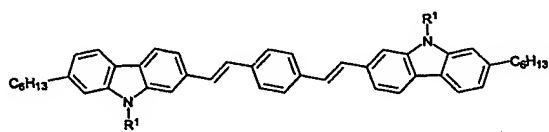


wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

68. An oligomer as defined in claim 67, wherein  $R^1$  is hexyl, 2-ethylhexyl or 4-octyloxyphenyl.

69. An oligomer as defined in any one of claims 65 to 68, wherein the second compound is benzyl cyanide.

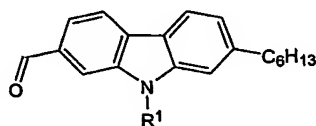
70. An oligomer as defined in claim 40 having the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

71. An oligomer as defined in claim 70, wherein  $R^1$  is methyl.

72. An oligomer as defined in claim 70, wherein the first compound of Formula I is of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

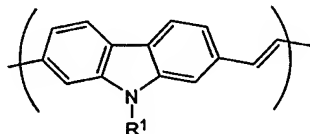


73. An oligomer as defined in claim 72, wherein  $R^1$  is methyl.

74. An oligomer as defined in any one of claims 70 to 73, wherein the second compound is 1,4-(bis)methylphosphonate)benzene.

75. A polymer comprising the reaction product of a compound of Formula I as defined in claim 3, and optionally at least one compound selected from the group consisting of 2,5-dioctyloxy-1,4-diformylbenzene; 2,5-bis(diphenylamino)terephthalaldehyde; [4-(2-ethylhexyloxy)-phenyl]-bis-(4'-formylphenyl)amine; 6,6'-dibromo-2,2'-bis(2"-ethylhexyloxy)-1,1'-binaphthyl; and 3-hexyl-2,5-bis(methylphosphonate)thiophene.

76. A polymer as defined in claim 75, comprising monomeric groups of the formula:

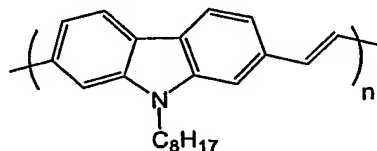


wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

77. A polymer as defined in claim 76, wherein  $R^1$  is hexyl or 2-ethylhexyl.

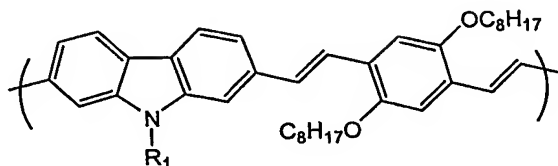
78. A polymer as defined in claim 77, wherein  $R^1$  is 2-ethylhexyl.

79. A polymer as defined in claim 78 having the formula:



wherein "n" is an integer ranging from 5 to 100.

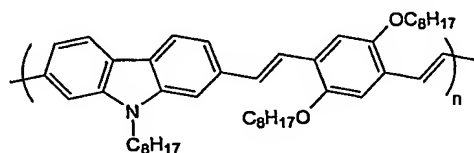
80. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

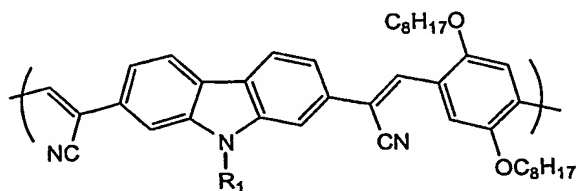
81. A polymer as defined in claim 80, wherein  $R^1$  is hexyl or 2-ethylhexyl.

82. A polymer as defined in claim 81 having the formula:



wherein "n" is an integer ranging from 5 to 100.

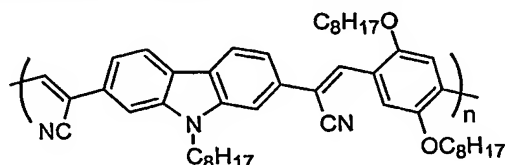
83. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

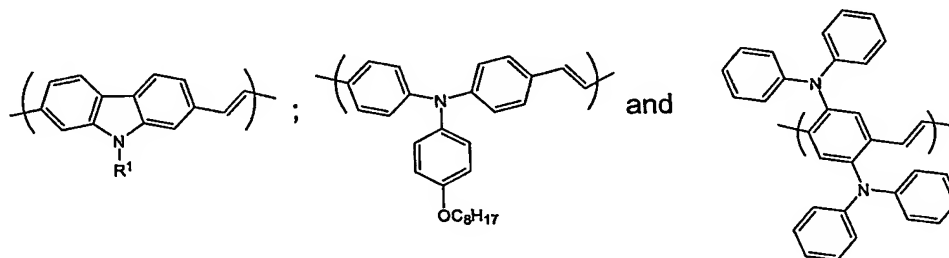
84. A polymer as defined in claim 83, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

85. A polymer as defined in claim 84 having the formula:



wherein "n" is an integer ranging from 5 to 100.

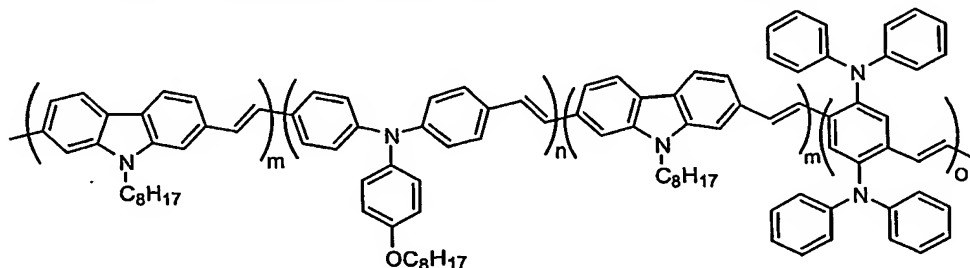
86. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

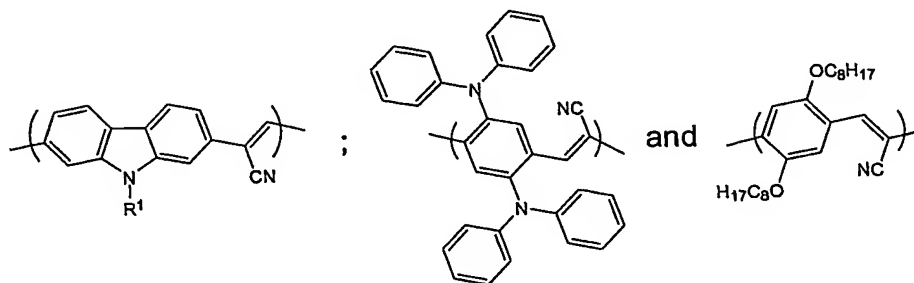
87. A polymer as defined in claim 86, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

88. A polymer as defined in claim 87 having the formula:



wherein "n", "m", and "o" are integers ranging from 5 to 100.

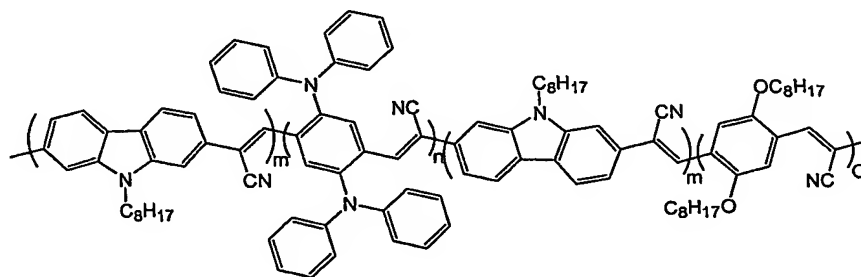
89. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein R<sup>1</sup> is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

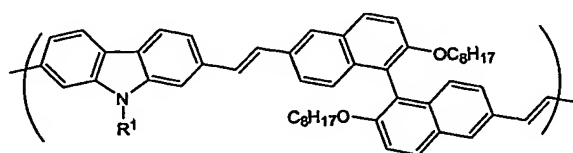
90. A polymer as defined in claim 89, wherein R<sup>1</sup> is hexyl or 2-ethylhexyl.

91. A polymer as defined in claim 90 having the formula:



wherein "n", "m", and "o" are integers ranging from 5 to 100.

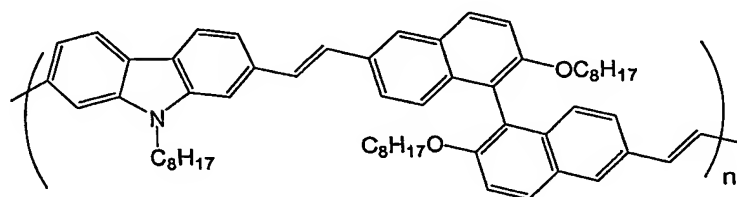
92. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

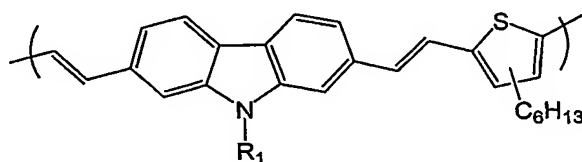
93. A polymer as defined in claim 92, wherein  $R^1$  is hexyl or 2-ethylhexyl.

94. A polymer as defined in claim 93 having the formula:



wherein "n" is an integer ranging from 5 to 100.

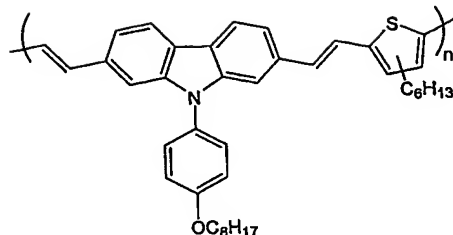
95. A polymer as defined in claim 75, comprising monomeric groups of the formula:



wherein  $R^1$  is selected from the group consisting of methyl, ethyl, propyl, isopropyl, cyclopropyl, butyl, *sec*-butyl, *tert*-butyl, cyclobutyl, pentyl, cyclopentyl, hexyl, cyclohexyl, heptyl, cycloheptyl, octyl, cyclooctyl, 2-ethylhexyl, nonyl, decyl, phenyl and 4-octyloxyphenyl.

96. A polymer as defined in claim 95, wherein  $R^1$  is 4-octyloxyphenyl.

97. A polymer as defined in claim 96 having the formula:



wherein "n" is an integer ranging from 5 to 100.

98. A 2,7-carbazolenevinylene-based material having charge transport properties comprising the oligomer and/or polymer of claims 40-97.

99. A film or coating having charge transport properties for use in an electronic device, comprising the oligomer and/or polymer of claims 40-97.

100. The film or coating of claim 99, wherein the electronic device is configured as a light-emitting diode.

101. The film or coating of claim 99, wherein the electronic device is configured as a field-effect transistor.

102. The film or coating of claim 99, wherein the electronic device is configured as a solar cell.